

Periodicity-Topic 13 (AHL)

H 95-50. Which of the following statements is/are true?

An element found in the 'd-block' of the Periodic Table would be expected to

- I. be a poor conductor of heat and electricity.
- II. exhibit a variety of oxidation states and colours.
- III. have a low melting point and a simple atomic structure.

A. I only B. II only C. I and II only D. I and III only

8. 91/12. Which one of the following species would require the greatest energy input in order to remove an additional electron?

A. Al B. Al^+ C. Al^{2+} D. Al^{3+}

9. 91/13. Which of the following pairs of species would have the greatest similarities in chemical properties?

A. ^{39}K and $^{39}\text{K}^+$ B. ^{39}K and ^{23}Na C. ^{39}K and ^{40}K D. ^{40}K and ^{40}Ca

11. 90/3. The first three ionization energies for two elements, X and Y, are

Ionization Energies (kJ mol^{-1})

	<u>First</u>	<u>Second</u>	<u>Third</u>
X	520	7,300	11,800
Y	1,086	2,350	4,620

Which pair of elements represents X and Y?

A. ${}_3\text{Li}$ and ${}_6\text{C}$ B. ${}_4\text{Be}$ and ${}_8\text{O}$ C. ${}_2\text{He}$ and ${}_4\text{Be}$ D. ${}_8\text{O}$ and ${}_{16}\text{S}$

12. 90/10. Which of the following has the largest radius?

A. Mg^{2+} B. Al^{3+} C. F^- D. S^{2-}

13. N98/7. Which one of the following atoms in its ground state has the greatest number of unpaired electrons?

A. Al B. Si C. P D. S

14. 94/49. A covalent compound is found to contain only silicon and hydrogen. The most probable formula for the compound is

A. SiH B. SiH_2 C. SiH_3 D. SiH_4

15. 93/49. Which one of the following metals is expected to react LEAST vigorously with water?

A. Mg B. Ca C. Na D. K

16. 92/51. In comparison with the other halogens, fluorine is the most reactive because its

- A. molecules have the greatest kinetic energy at a given temperature.
- B. oxidizing power is the greatest.
- C. density is the lowest.
- D. atomic radius is the smallest.

17. 92/53. When germanium, Ge, reacts to form a stable compound, it would be expected to attain an electron configuration similar to that of

A. krypton. B. tin. C. arsenic. D. argon.

18. 91/11. Which of the following sets contains elements which have nearly the same atomic radius?

A. F, Cl, Br, I B. Li, Na, K, Rb C. O, S, Cl, Ar D. Mo, Tc, Ru, Rh

21. A96/13 Of the eight elements in the third period (sodium to argon), how many are metals?

A. 2 B. 3 C. 4 D. 5